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B65D 83/14

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F1R RDX

(56) Documents Cited
GB 2321279 A GB 0967039 A US 5457934 A
US 5236262 A US 4641974 A

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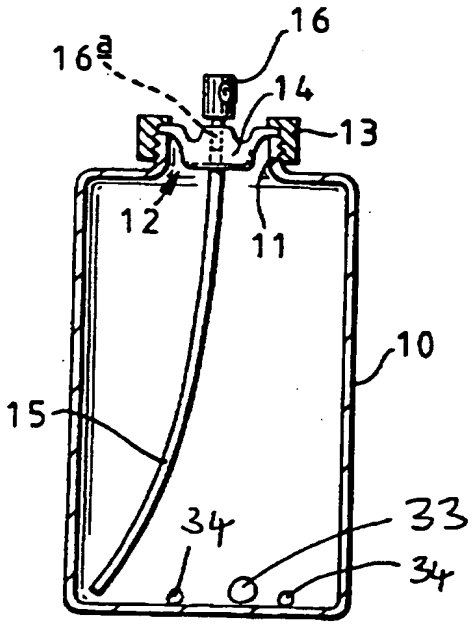
(54) Abstract Title
Aerosol container with different sized agitating elements

(57) An aerosol container 10 contains at least two agitating elements 33 , 34 of significantly different size and weight. The agitating elements may be loose in the container, tethered to the container or tethered to each other. Two smaller elements 34 may be provided, and the elements may be spherical and formed from steel. The different sized elements cooperate to break up material between them in a manner somewhat analogous to a ball mill, and enhance dislodgement and mixing of deposits of fluid or constituents thereof on the bottom the container.

FIG 1



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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

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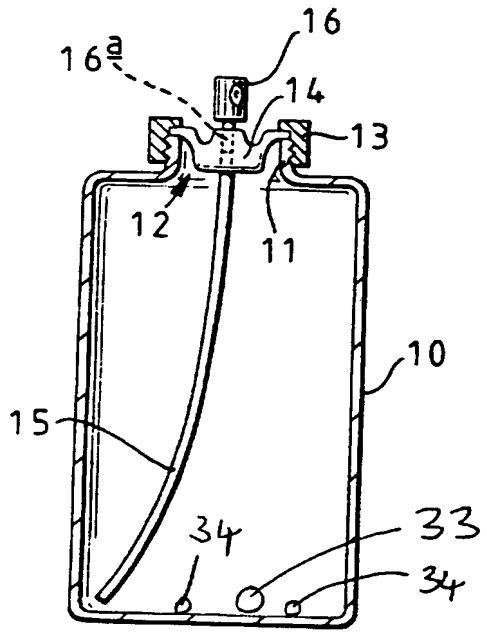
FIG 1



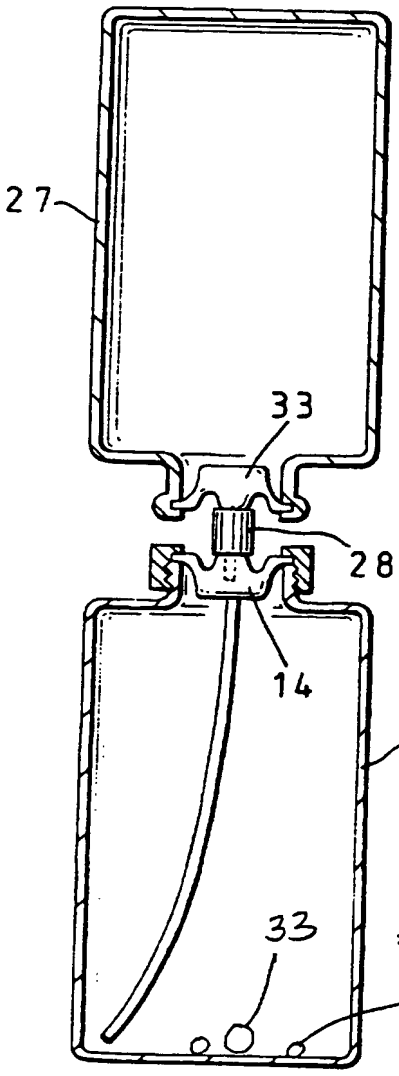


FIG 4

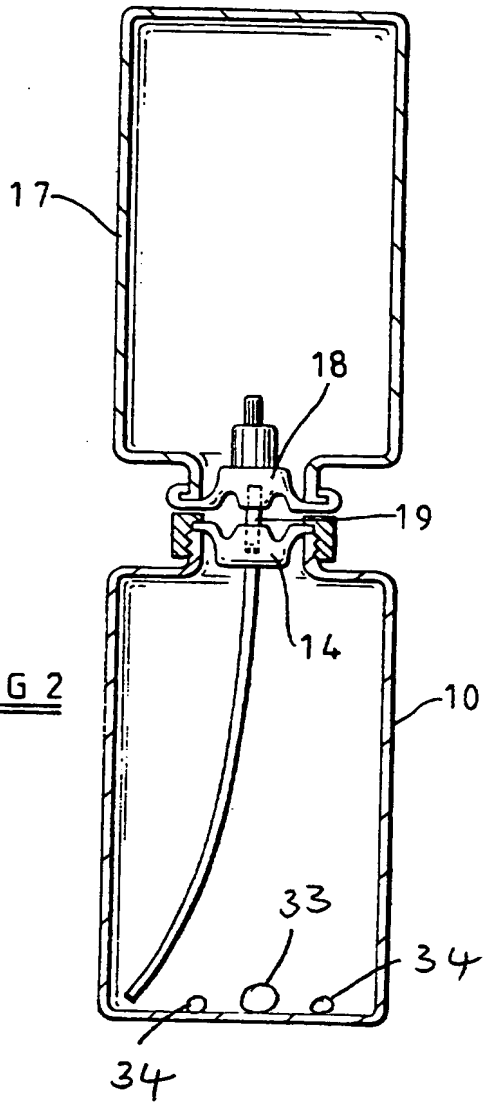


FIG 2

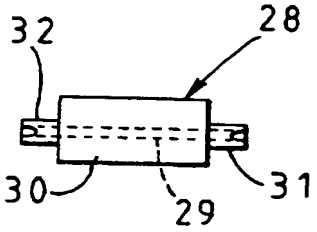


FIG 3

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Aerosol Systems

The invention relates to aerosols and particularly, but not exclusively, to refillable aerosols. The term aerosol will be used herein to mean a container containing a fluid, usually a liquid, and a propellant, the container being provided with an operable outlet valve through which the fluid may be dispensed in a fine spray under pressure from the propellant.

In the commonest type of such aerosols, the container is supplied ready charged with a fluid product and propellant, and is disposed of when the contents have been exhausted. There is also a requirement, however, for refillable aerosols since such an aerosol permits the user to dispense any fluid with which he may care to fill the aerosol container.

Known refillable aerosols normally use pressurised air as a propellant, the air being pumped into the container by some means after the fluid product has been introduced into the container. The disadvantage with such aerosols is that, as the fluid product is expelled, the air pressure within the container falls and the effective atomisation of the product is reduced. According to one embodiment of the present invention, a refillable aerosol may use a standard type of aerosol propellant of the kind which boils off at low temperatures with the result that the pressure inside the container is kept at a substantially constant level as the product is dispensed.

It is common practice to include in an aerosol container an agitating element which moves about in the container when it is shaken. The element commonly comprises a heavy ball-bearing and is commonly used where the fluid in the aerosol is a liquid which is likely to settle and perhaps begin to separate into different constituents, if the aerosol is not used for some time. Shaking of the container agitates the element

in the liquid, providing a mixing effect, prior to dispensing of the liquid.

In practice, however, the agitating and mixing effect of the element is not particularly efficient and considerable shaking of the container may be necessary before the liquid is in a suitable condition to be dispensed. Even so, it is common for liquids to settle as a thick sludge on the bottom on the container, and while the agitation of the element in the container may adequately mix the majority of the liquid, it will not usually break up a sludgy deposit of liquid on the bottom of the container.

The present invention provides an improved form of aerosol where this problem maybe partly or completely overcome.

According to the invention there is provided an aerosol comprising a container containing a fluid and a pressurised propellant and having an operable outlet valve through which the fluid may be dispensed in a fine spray under pressure from the propellant, there also being disposed in the container at least two agitating elements which are movable relative to the container and to each other, said elements comprising a larger element and a smaller element of significantly different size and weight.

By providing agitating elements of different size and weight, it is found that complete mixing of the fluid in the aerosol may be more effectively achieved. In particular, the arrangement enhances the dislodgement and mixing with the rest of the fluid of any deposit of the fluid, or constituents thereof, on the bottom of the container. The elements of different sizes cooperate with one another to break up material between them in a manner somewhat analogous to the action of a ball mill.

Preferably the elements are loose in the container, and are unconnected with the container or with one another. However, the invention does not exclude arrangements where the elements are tethered to one another or to the container. For example,

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tethering of the elements together may ensure that they are kept close enough to one another always to cooperate in mixing and dislodging the fluid in the container.

In a preferred arrangement there is provided a single larger element cooperating with two smaller elements. In this case the smaller elements may be substantially the same size and weight, although it is possible for all three elements to be of different size and weight.

The elements may be spherical and may be formed from steel. For example they may comprise ball-bearings, which are readily available in different sizes. However, other shapes are possible and the elements may be of any other convenient shape and relative size and weight.

The following is a more detailed description of embodiments of the invention, reference being made to the accompanying drawings in which:

Figure 1 is a diagrammatic section through a refillable aerosol container according to the present invention.

Figure 2 shows diagrammatically a process for pressurising the refillable aerosol from a propellant container,

Figure 3 is a side elevation, on an enlarged scale, of a connector for use in an alternative method, and

Figure 4 shows diagrammatically the process of pressurising a refillable aerosol container using the connector of Figure 3.

Referring to Figure 1, the refillable aerosol comprises a cylindrical canister 10 of metal or plastics having at its upper end a threaded neck portion 11 surrounding an aperture 12. An internally threaded collar 13 screws onto the neck portion 11 so as to clamp in position a standard operative component 14 having an outlet passage 16a in

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which there is located a normally closed valve, not shown. A dip tube 15 extends from the passage 16a to the bottom of the canister and a removable manipulating nozzle 16 is received in the upper end of the passage 16a. In conventional manner, manual depression of the manipulating nozzle 16 opens the valve in the passage 16a to deliver fluid under pressure from the container.

The method of filling or refilling the aerosol is as follows:

The threaded collar 13 is unscrewed and the component 14 is removed. A measured quantity of paint or other sprayable fluid is introduced into the canister 10. A small number of ball bearings or similar agitators are also be placed in the can with the fluid to facilitate mixing, as will be described. The component 14 is then placed in position and the collar 13 screwed over the top of the component thus securing it in the neck of the canister. The standard rubber gasket (not shown) of the valve acts as a seal, although a separate seal maybe applied as well as or instead of the gasket.

Figure 2 shows how the aerosol container is pressurised. For this purpose there is used a container 17 filled with a standard aerosol liquid propellant and of the known kind having a valve component 18 fitted with a projecting hollow tubular spigot 19, depression of which opens a normally closed valve (not shown) to release the propellant from the container.

As shown in Figure 2, the container 17 is inverted over the container 10 and the spigot 19 is introduced into the valve component 14 of the refillable container, the nozzle 16 having first been removed. This action opens the valves in both the components 18 and the component 14 so that the liquid gas propellant in the container 17 flows through the hollow spigot 19 under pressure into the container 10 until the pressure in the two containers becomes equalised. The container 17 is then removed,

the two valves closing automatically, and the nozzle 16 is refitted to the container 10 which is then ready for use to dispense the fluid with which it has been filled.

When the container has been exhausted it may be refilled again by repeating the above described process.

Figures 3 and 4 show an alternative method by which the aerosol container may be pressurised. In this case the container 27 filled with a standard aerosol liquid propellant is of a different type where the valve component 33 simply has a passage including a normally closed valve, although there may be fitted in said passage a removable nozzle somewhat similar to the nozzle 16.

In this case connection between the two containers is effected by an adaptor 28 which is shown in greater detail in Figure 3.

Referring to Figure 3, the adaptor 28 has a central passage 29 passing through the main body 30 of the adaptor and spigots 31 and 32 at each end. The spigots are slotted at the ends to allow the passage of the propellant.

As shown in Figure 4, one spigot of the adaptor 28 is introduced into the valve component 33 of the container 27 of propellant. The container 27 is then inverted and the other spigot of the adaptor introduced into the valve component 14 of the refillable container, the nozzle 16 having first been removed. The liquid gas propellant in the container 27 then flows through the adaptor 28 into the container 10 until the pressure in the two containers becomes equalised. The container 27 and adaptor 28 are then removed and the nozzle 16 is refitted to the container 18 which is then ready for use to dispense the fluid with which it has been filled.

The container 17 or 27 of propellant may be of a type which is readily available on the open market, for example as an airbrush propellant. The can of propellant may

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be of a size such that it holds just enough gas for one charge, or may be sufficiently large to charge the refillable container a number of times.

With some types of fluid to be dispensed, the propellant may comprise a pressurised container of butane gas of the kind which is commonly supplied, and is readily available, for the charging of gas cigarette lighters and similar devices. The butane gas is particularly effective as a propellant and has the added advantage that with some fluids, such as certain forms of paint, the butane itself may serve as a thinner to reduce the viscosity of the fluid before it is dispensed.

Instead of the refillable container having a female valve component to receive a spigot on the container of propellant, as shown in Figure 2, it could itself be provided with a hollow spigot in which case it could be filled from a propellant container having a female valve component.

In the case where an adaptor 28 is provided, such adaptor may have any appropriate configuration depending on the nature of the valve component on the refillable container and the valve component of the propellant container. A refillable container might be sold with a number of different adaptors for connecting the container to a variety of types of propellant container.

Other methods of gaining access to the inside of the refillable container are possible, such as using a non-standard can with a threaded collar and nut part way up the outside of the can. Another method would be to use a can with a standard sealed neck, but with a removable bottom.

As previously mentioned, agitating elements are provided in the container 10 for the purpose of mixing the fluid in the container prior to dispensing the fluid. In accordance with the invention there are provided at least two agitating elements

comprising a large element and at least one significantly smaller element.

Referring to the drawings, the agitating elements comprise a large steel ball-bearing 33 and two smaller steel ball-bearings 34.

The ball-bearings may be of any suitable relative size, but typically the larger ball-bearing 33 may have a diameter of about 10mm and each of the smaller ball-bearings 34 may have a diameter of about 5mm.

When the container is shaken before use the ball-bearings move rapidly in the fluid in the container and relative to one another and cooperate with an action, similar to that which occurs in a ball mill, in order to mix the components of the fluid if they have tended to separate and/or to reduce the viscosity of the fluid or, in particular, to act to break up and disperse any deposit of fluid which may have settled on the bottom wall of the container.

Agitating elements in the form of ball-bearings are preferred since these are readily available and may be of convenient size and weight to perform the required action. However, other shapes of agitating element are possible. Although one larger element and two smaller elements will usually be effective for mixing purposes, a greater number of both larger and smaller elements may be employed, depending on the nature of the fluid in the container.

Although the agitating elements have been described as used in a refillable aerosol container, this is by way of example only, and it will be appreciated that agitating elements according to the invention may also be used in conventional non-fillable aerosols.

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CLAIMS

1. An aerosol comprising a container containing a fluid and a pressurised propellant and having an operable outlet valve through which the fluid may be dispensed in a fine spray under pressure from the propellant, there also being disposed in the container at least two agitating elements which are movable relative to the container and to each other, said elements comprising a larger element and a smaller element of significantly different size and weight.

2. An aerosol according to Claim 1, wherein the elements are loose in the container, and are unconnected with the container or with one another.

3. An aerosol according to Claim 1, wherein the elements are tethered to one another.

4. An aerosol according to Claim 1 or Claim 3, wherein the elements are tethered to the container.

5. An aerosol according to any of the preceding claims, wherein there is provided a single larger element cooperating with two smaller elements.

6. An aerosol according to Claim 5, wherein the smaller elements are of substantially the same size and weight.

7. An aerosol according to Claim 5, wherein all three elements are of different size and weight.

8. An aerosol according to any of the preceding claims, wherein the elements are spherical.

9. An aerosol according to any of the preceding claims, wherein the elements are formed from steel.

10. An aerosol according to any of the preceding claims, wherein the aerosol

is a refillable aerosol.

11. An aerosol substantially as hereinbefore described with reference to the accompanying drawings.

Application No:	GB 9816282.9	**Examiner:**	Dave Mobbs
Claims searched:	1-11	**Date of search:**	11 January 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): F1R RCX, RDA, RDX.

Int Cl (Ed.7): B65D 83/14

Other: ONLINE: EPODOC, JAPIO, WPI.

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2,321,279 A	(BATH & BODY WORKS INC.)	1, 2
X, Y	GB 967,039	(SPRAYON PRODUCTS, INC.)	X: 1, 2, 5, 6, 8, 9; Y: 3, 7, 10.
X	US 5,457,934	(THE SHERWIN-WILLIAMS COMPANY) - see column 7 lines 25-36.	1, 2, 8, 9.
Y	US 5,236,262	(CRECO CORP) - see the figures.	3
Y	US 4,641,974	(CHURCH) - see reference 20 in the figures.	3

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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